

REMARKS

Claim 1 was amended and claim 8 was canceled. Support for the amendment to claim 1 can be found in claim 8 as originally filed and in the specification.

Claims 1-8 and 9-16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Farooque, US 4,917,971 (hereinafter the Farooque patent) in view of Hildebrandt et al., US 5,175,061 (hereinafter the Hildebrandt patent) in further view of Kahara et al., US 4,810,595 (hereinafter the Kahara patent). Applicants respectfully traverse this rejection based on the claims as currently amended.

Claim 1 claims a process for the generation of electricity and the production of a concentrated carbon dioxide stream using a molten carbonate fuel cell, the fuel cell comprising an electrolyte sandwiched between an anode and a cathode, an anode chamber and a cathode chamber, wherein the process comprises: feeding a fuel gas to the anode chamber and a cathode inlet gas comprising carbon dioxide and a molecular oxygen to the cathode chamber; producing electricity, an anode off-gas and a cathode off-gas via anode and cathode reactions; feeding at least part of the anode off-gas to a catalytic afterburner wherein it is oxidized with an oxidant to obtain an oxidized anode off-gas; recycling the remainder of the anode off-gas to the anode chamber; wherein the oxidant consists of part of the cathode off-gas and/or part of a molecular oxygen containing external oxidant stream, which external oxidant stream comprises at most 20% (v/v) nitrogen; the oxidized anode off-gas is brought into heat-exchange contact with the remainder of the cathode off-gas and the remainder of the external oxidant stream to obtain a cooled anode off-gas and a heated mixture of cathode off-gas and external oxidant; the cathode off-gas is cooled before it is brought in heat-exchange contact with the oxidized anode off-gas; the cooled anode off-gas and the heated mixture of cathode off-gas and external oxidant are fed to the cathode chamber as cathode inlet gas; *as soon as a set point in the carbon dioxide concentration at the cathode chamber outlet of in the range of from 5 to 40% (v/v) is reached, part of the cooled anode off-gas is withdrawn from the process.*

It would not have been obvious to one of ordinary skill in the art to combine the teachings of the Farooque patent with the teachings of the Hildebrandt patent. The

Farooque patent teaches that the fuel cell is operated such that the heat produced by the exothermic electrochemical reaction is the same as the heat required by the endothermic reforming reaction. This allows the fuel cell to be operated without any outside cooling. To achieve this result excess reforming must be conducted which results in excess process gas feed to the fuel cell. The Hildebrandt patent teaches the recycle of the cathode outlet gas to cool the fuel cell. It would not have been obvious to combine the teachings of these two patents because when operating according to the Farooque patent, there would be no need for the additional cooling taught by the Hildebrandt patent. The Kahara patent does not add any additional support for this combination.

The Examiner submits that "Kahara recognizes the need for CO₂ control mechanism in the fuel cell for its improved performance and stability." This is a conclusory statement and the Examiner has relied on broad general disclosures to come to this conclusion. The teachings of the Kahara patent do not render claim 1, as amended, obvious.

It would not have been obvious to one of ordinary skill in the art to combine the teachings of the references cited here by the Examiner, and even if they were combined the combination would not teach all of the limitations of claim 1 which claims a process using a molten carbonate fuel cell. None of the references teach or suggest a process as claimed in claim 1 wherein *as soon as a set point in the carbon dioxide concentration at the cathode chamber outlet of in the range of from 5 to 40% (v/v) is reached, part of the cooled anode off-gas is withdrawn from the process.*

In light of the above, Applicants respectfully request allowance of the amended claims of this application. Should the Examiner find any impediment to the allowance of this case that could be corrected by a telephone interview, the Examiner is requested to initiate such an interview with the undersigned.

Respectfully submitted,
Jozef Peter Paul Huijsmans et al

By their attorney: /James D. Carruth/
James D. Carruth
Reg. No. 55,038
Shell Oil Company
(713) 241-0135

P.O. Box 2463
Houston, Texas 77252